from the time of death to the autopsy, then we would have an 18. But we know that's not true --

Q. Okay.

A. -- because of postmortem redistribution.

So what I'm trying to say is we take that level of 18 in the blood, and I'll say it's three times too high based on PMR and it's heart blood and whatever, and that's the figure I would say.

That's an average. It's above an average. And if we do that, we are going to cut it to six.

So that means at the time of death we have a value of six.

See how I'm quantifying based on the actual number that I have?

And that six, then, would be a target value that I would assume would be sometime around that time of death.

Now we have the kinetics of digoxin while she was alive. And the half-life of the drug is 30 hours, as -- 24 to 30 hours.

So if we go back to the time she started getting sick, we are dealing with a half-life, so this value has to be higher.

How much higher? Well, if we take it as one half-life, then it's 12. Is that greater than any therapeutic range in the published literature? Yes. Can I be certain that's that 12? No.

But that's the work-up that I did, and that would be what I would testify to.

And there are assumptions in there and there are caveats, and I would present that.

Q. But making those assumptions, and with the caveats that you are going to tell me about in just a minute, do you feel comfortable that that is a reasonably probable opinion?

A. I do.

Q. I guess one of the primary assumptions you are making is this PMR rate of what, two or three?

A. I'm using three, as I explained. I'm using -- I would use three.

Q. What if it was ten?

A. Then all of these calculations would change. If you were to be questioning me in that and saying to me, Can you redo the calculations based on ten, I would do the same work-up for you, and I would come up with another number.

And I would say, Based on that hypothetical, using the same -- the same information

that I have, here's what the number that I would come up to be.

Q. Okay. Where did you come up with the two or the three?

A. Again, based upon the reference in Baselt; and it comes from the Vorpahl and Coe article, is what he cites.

Q. And the two and the three that you are talking about, that's nothing that you have come up with; that is a number and assumption that you are taking from someone else's study or literature and putting that into the equation.

A. Yes.

Q. How do you make a determination whether an article that concludes a twofold number is more accurate than an article that concludes a tenfold number in relation to the PMR?

A. You read -- as a scientist, you read the article, you evaluate the way that the research was conducted and the conclusions that were drawn, and you come up with an assessment of that article in light of all the other information that you have about that particular topic.

Q. And how many articles did you read from the vast array of literature out there to come to the

two or three assumption that you're plugging into your calculation?

A. It's a small number.

Q. How many?

A. Well, I don't know what I actually have here. I'll count them for you. Nine.

Q. And do all -- do each of those nine articles have discussions in them about the PMR?

A. No.

Q. So how many of the nine really relate to this two or three number?

A. I mean, you are really getting specific now. You want me to say half of them, three, four?

Q. I don't want you to ballpark me on this. Give me an actual number of articles that -- because, I mean, isn't this the linchpin in your calculation, this two or three number?

A. No.

Q. Well, let me ask you this question.

A. Can I answer?

Q. Sure, go ahead, go ahead.

A. Let me answer. Let me take -- and I mentioned this before, and even Mr. Moriarty brought it up in one of the articles he presented to me.

Tricyclic antidepressants are the poster child for postmortem redistribution.

You can have levels of PMR in articles or studies done on amitriptyline, for example, that go from .6 to 15. But what is the average? The average is three.

Now, that means that if we say digoxin is very similar to tricyclic antidepressants, which I don't think they really have a PMR as significant as that; and the one reference from the Coe article says about two, and I'm saying let's make it like a tricyclic and let's make an average of three.

Are there situations where we can get up to ten, as you are describing and others have? Absolutely. Are they common? No.

And just as common we can have situations where PMR is not affected to any significant degree, and there's articles that will come down to one or less than one. So I'm taking the average.

There's a big range here. And I'm not saying that the ranges that are published are wrong. I'm just saying I'm using the average value for the most common type of situations.

Is there a possibility that in this

particular case the PMR could have been ten? I will admit to that. Certainly. I have no problem with that.

And so, you know, we can parse it out into how many articles say this and how many articles say that, but that's how I do my job; looking at the bulk of what I know and come up with a conclusion.

Q. Before Mr. Miller hired you in this case, did you know anything about the PMR of digoxin?

A. Yes.

Q. But you have never testified in a digoxin case? You have never -- am I correct?

A. That's correct.

Q. Okay. And you hadn't analyzed digoxin before this case?

A. I do no analysis.

Q. Okay.

A. I've seen reports that we have done for digoxin at NMS. We do about 1200 different compounds.

My job as a toxicologist here is to know as much as I can about as many of those compounds as possible. And for my teaching experience, I taught digoxin for 23 years, so I'm familiar with digoxin.

I'm familiar with the pharmacology of

it, I'm familiar with the toxicology of it.

And when I got into forensic toxicology, I learned about PMR, and certainly I learned about digoxin's PMR as one of the compounds that I've known about.

Do I know everything about it? No way. Do I know everything about every compound we do here? No way.

But I do have knowledge about the subject.

Q. Before I forget to ask you, have you ever been to Oklahoma University?

A. No.

Q. Have you ever worked in Oklahoma?

A. No.

Q. Are you aware of another Barbieri that's worked in Oklahoma?

A. No.

Q. Have you asked to see this patient's medical records?

A. No, I haven't.

Q. Do you need to see them to be able to testify in this case?

A. It depends what I'm asked.

Q. Are you qualified to render any kind of

opinion about whether clinical signs or symptoms of toxicity were present in a patient?

A. I would not go there.

Q. In other words, you would not offer an opinion on that subject?

A. If the medical records show signs and symptoms of toxicity, I would be -- I could render an opinion that that drug has a capacity to produce those toxicities; they are consistent with that compound.

But I would not render an opinion, for example, that that drug in this particular case caused that particular toxicity. That's not what I do and that's not my background. I'm not a medical doctor.

Q. Right.

A. I'm not a clinical toxicologist.

Q. What's the -- I'm sorry.

A. So I have training in that -- I paused, I'm sorry.

I have training in clinical toxicology because I've taught clinical toxicology when I was in medical school, but that's not my job.

Q. For purposes of our discussion, what's the difference between a forensic toxicologist such as yourself and a clinical toxicologist?

A. A clinical toxicologist rarely works

with postmortem sampling. They are less interested in postmortem levels of compounds and various body tissues and fluid. That's for forensic toxicologists. It's different.

The clinical toxicologist is more about what happens to the living individual and how that relates to the therapy in that individual and other drug interactions.

Q. So hypothetically, for example, if Ms. Johnson's surgeon, Dr. German, who performed the surgery that she was in McBride Hospital for, testifies that clinically she was not exhibiting any signs or symptoms of toxicity, you would not dispute that or have any basis to dispute that.

A. That's absolutely correct.

Q. If testimony like that was available from health care providers that were taking care of Ms. Johnson, for example, say from like April the 15th and during her hospitalization on like April the 25th, April the 26th, would health care provider opinions that were privy to or observing her and not seeing any signs or symptoms of toxicity, would testimony like that in any way impact your ballpark opinion?

MR. MORIARTY: Objection to form.

THE WITNESS: I certainly would not

dispute any of those things. That's all important information that there was no consistency in terms of what the signs and symptoms observed at a particular time.

Now, how would it impact my opinion? My opinion is, again, based upon a postmortem level with some assumptions of retrograde calculations.

So there may be a conflict in what I would end up saying based upon the signs and symptoms observed when she was alive.

But I'm not going to -- I would not change my opinion of the calculations that I described just because someone else has different observations. That's all part of the information of the case.

And I would not refute that. I would not refute in any way what a medical professional observed for a patient.

BY MR. McPHAIL:

Q. Is there any way to factor clinical information into this back calculating that you do?

A. No.

Q. So although there are assumptions and caveats in your back calculation, it doesn't in any way take into account the in-the-trenches clinical information that the nurses and doctors and folks

taking care of Ms. Johnson have available or had available to them.

A. No. The calculations I described would not impact on that. But in the end, in terms of evaluating what I came up with versus what they see, then obviously there is an issue.

But I would not opine to, you know, any kind of discrepancy between those issues.

If asked, I would say, well, it's not consistent then; their observations are not consistent with my calculations.

And let the trier evaluate that, let the jury evaluate that.

Q. Would a clinical toxicologist be in a better position than you to render this -- or to address this issue in this particular case?

A. Which issue are you speaking of?

Q. Well, we have been talking about how clinical signs and symptoms exist in relation to toxicity cases, or they can.

You understand that to be correct?

A. Yes.

Q. Okay. If this is going to boil down to an issue of was she toxic or not, then you are not equipped to in any way evaluate the clinical side of

that, and, in fact, the clinical issue; that doesn't in any way even enter into the foundation for your opinion, correct?

MR. MILLER: Object to form.

THE WITNESS: In a way you are correct.

As long as a patient is alive and being treated in any circumstances, and I've always done this in the past, if there's any issue in terms of patient treatment, observations by medical professionals, I always refer them to either a clinical toxicologist or the treating M.D.

I would never opine to those issues.

And so you are right; my calculations are based upon a postmortem test result and going back to postmortem, and then making assumptions in terms of half-life and et cetera in this particular patient.

So, yes, it's a long way of saying I tend to agree with you.

BY MR. McPHAIL:

Q. This is -- the issue of toxicity, it's the elephant in the room, isn't it? I mean, that's what this case is about as you understand it. Is that correct?

MR. MILLER: Object to form.

THE WITNESS: From what I'm gathering,

yes.
BY MR. McPHAIL:
Q. Okay. And you weren't in the room at the time that she was at McBride Hospital, obviously, correct?
A. Obviously not.
Q. And essentially what you have got is a blood sample and a vitreous sample that you have analyzed, and are now trying to back calculate into what was going on in the room that you were not in. Is that correct?
A. I didn't get into the hospital here.
I mean, I'm trying to back calculate in terms of theory based upon the kinetics of the drug, some postmortem issues, to try to give some kind of a picture to where we might be or where she might have been in terms of that.
Q. Do you understand when she was in McBride Hospital?
A. I don't have that, no.
My understanding, if I could just add, that this all happened after she left the hospital. That was -- this last dose -- my understanding from discussion was this last dose was taken, you know, and then she was at home.

That's what I was made to understand. And if that's incorrect, that's incorrect.

But that still doesn't impact on the estimates that I'm trying draw here, again, based upon a postmortem value that's taken after, during autopsy.

Q. You said something in one of your responses to one of Mr. Moriarty's question about "Someone more versed in digoxin testing than I am"?

A. Well, I think the question was asked would any forensic toxicologist come to the same conclusions or do the same thing, I think that was the question.

And I said certainly I'm not the world's expert on digoxin or postmortem redistribution; and someone who is more versed in that would, you know, may be in a better position or come up with different conclusions.

I'm willing to admit to that.

Q. How many times have you in your professional experience done what you are doing today, which is look at data and back calculate with regard to a digoxin level?

A. This is the first case that I had to do an estimate like this.

Q. So this would be the only time you have ever done it in your professional career.

A. Right. I had another digoxin case that I worked on an expert report, or in the preparation of a report where we talked about some of these kind of issues, but no final report was done. So I worked on the case.

So this is the second digoxin case, but this is the first time that I have done this type of calculation based on the data that I have.

Q. Well, so if we went to someone that had even looked at this issue twice, we would be finding somebody that was more versed in digoxin testing than you are.

A. How would you know that?

Q. From what you are just telling me.

A. All I'm saying is, you know, I have had experience with teaching digoxin, knowing about the compound for my whole career, 35 years.

Q. Okay.

A. And just because someone has taken -- you know, has done two cases, you know, they may not have the knowledge base that I have. So I can't answer that question.

All I'm saying if someone knows more

about the compound and knows more about the issues, then certainly I would be willing to say, you know, listen to them, don't listen to me.

Q. Okay. It's just the back calculation formulas that you are doing in this case that you have never done before, correct?

A. Well, for this compound.

Q. Right.

A. I've done back calculations for many other compounds.

Q. For digoxin.

A. Yes, of course. But the principles are the same.

Q. Let me rephrase my question just so -- it's kind of jumbled up there.

It's just the back calculation in relation to digoxin in this particular case that you have never done before. Is that correct?

A. Agreed, correct.

Q. Is there anything that you can look at in your litigation packet, or in any of the data that NMS has produced, for you to be able to comment whether there was an acute process going on or a chronic process going on in Ms. Johnson?

A. No. We just have analytical data, and I

have no supplemental background data about the case in the files that I reviewed.

Q. Okay. But, I mean, you understand my question?

A. I do.

Q. And that's something that you comment on in a lot of cases, in terms of whether you have an acute ingestion of something or a chronic ingestion of some drug? That's a common issue for you to deal with in a lot of cases, isn't it?

A. It's a common issue. And sometimes you can answer that question if you have a metabolite that you can measure.

For example, knowing that a certain compound produced a certain level of metabolism, okay, on an either acute dosing and chronic dosing, and the levels of those two compound are completely of whack, you can make an opinion that this was an acute situation versus a chronic.

Here we have one compound, there's no metabolite to look at. There's no way to know this.

All I can tell you is, you know, we know that this individual in two of her samples had digoxin in certain concentrations, and then you can work back the way it did.

Q. Do you know anything about Ms. Johnson's prescription or the pills that she was taking?
A. No, not at all.
Q. Is there anything that Dr. Kevin Ballard can tell us about the blood sample or any of the data in that litigation pack that you couldn't tell us?
A. Well, at the present time, no. Dr. Ballard passed away shortly after.
Q. I'm sorry, I didn't know that. I was not aware of that.
A. That's okay. He would have been very helpful in terms of the analytical data.
Q. Well, the only reason I ask is I think you indicated he was the final reviewer of that sample. And that's why I was wondering if he would have had an additional or a different insight than you would have had.
A. I understand, he did the final.
Actually, he developed both of these methods, or the methods for both these cases for digoxin measurement by NMS. And he did review the blood work prior to the report going out.
Q. Are you familiar with NMS's Website, Doctor?
A. Somewhat. I don't look at it on a

routine basis.

Q. Are you familiar with NMS's advertising of their expert witness services?

A. I have read it one time.

Q. Have you ever seen this ad?

A. No, I haven't.

MR. MILLER: It doesn't look like you.

BY MR. McPHAIL:

Q. Have you ever seen this ad?

A. Yes.

Q. It's, I guess, similar to the one that's on the wall up there in our room here, isn't it?

A. That's one of the things that our marketing department came up with.

Q. Other than the Website, where do these ads like this one, where do they get printed? What trade journals do they go out in, do you have any idea?

A. I don't. I don't have any. So that would be for our marketing department to answer that.

Q. Would that be something that Shelly Carolan, your marketing and business development vice president, would know about?

A. Yes, she would.

Q. Why does NMS have a sales and marketing

vice president?

A. That's the way the executives of the company decided to set up the company.

We're a for-profit organization, we are a privately owned company. We need profit in order to continue to hire new people, support new equipment and technologies. So we have to, you know, sell our services.

Q. Are you offering Mr. Miller your basic, expanded or expert services?

A. Those are lab designations for testing. There are different panels of autopsy panels: basic, expanded and expert.

Q. So that doesn't apply to this --

A. No.

Q. -- Ms. Johnson's testing or this lawsuit?

A. No. This is part of our expert services division, totally different.

And those services are different levels of sophistication and complexity in terms of the work that we do analytically.

Q. What is TNH Enterprises?

A. I don't know. Can you help me with what TNH would stand for? Can you show me a document that

may help me?

Q. (Handing document.)

A. I've never seen this. I have no idea. I see my name is on there, the bio, but I have no idea. I have never contacted and I have never spoken to anybody from that organization.

Q. Just real quickly, do you recognize any of these names?

A. John DiGregorio is the medical director, I have known John for 35 years. Of course, there's my name here. I don't know him, don't know him. No, just John.

Q. Okay. Mr. Moriarty asked you some questions about the September 22nd telephone call that you had with Mr. Miller and Mr. Deligans?

A. Yes.

Q. One of the things that I think you told me you said that from out of that telephone call you received, I think your words were two charges: one to proceed with the investigation of digoxin, and the second one was to see if you could find a vitreous what?

A. Some correlation between the vitreous digoxin level and some blood level, whether it be postmortem blood, antemortem serum, something like

that.

Some kind of an association that I could say there's a factor that the person might use for that. And I could not.

Q. All right. How much time did you spend proceeding with the investigation of digoxin?

A. For this case?

Q. Yeah. I'm talking about what you understood your charge to be from the September 22nd telephone conference with Mr. Deligans and Mr. Miller.

A. Up to and not including yesterday's meeting, I put in about six and a half hours on the investigation.

Q. Can you describe -- I'm sorry. I keep cutting you off.

A. I was saying the investigation in terms of what I was asked to do.

Q. Okay. Did you say six and a half hours?

A. Yes.

Q. Can you tell me or break down the six and a half hours in terms of what you did to investigate digoxin?

A. Sure. The first 30 minutes was our telephone discussion. I spent two and a half hours

doing literature research and review.

I spent about two hours reading the papers that I've gotten and rereading the papers and making notes, highlighting notes in the papers. And then I spent another hour and a half going through the litigation package.

After I got that down, I went back and looked at the papers again to try to get some kind of an estimate of levels based upon the vitreous number that we have.

So that's the breakdown that I have on my notation sheet.

Q. And the two and a half hours of medical literature research that you did produced the nine papers here in front of us?

A. Yeah. It's not complete. There were a lot of papers that the titles didn't impress me, it was not what I was looking for.

So I tried to kind of boil it down into some reasonable small group so I didn't have an extensive volume of literature that I felt was unnecessary.

Q. During your medical research, did you locate any articles that didn't necessarily support your position?

A. No, I did not.
Q. Did you consult the NMS electronic library that you referenced earlier to see what was saved there in relation to digoxin?
A. I did, and the postmortem papers -- this was in the postmortem end.
Q. The Vorpahl article?
A. The Vorpahl and Coe article, which was there. And there was also a general article about postmortem distribution that did not have anything to do with digoxin, although it was included in the digoxin file.
So there was nothing other than this paper and it was the same. Everything else came off of the Internet search that I did.
Q. And then you said you had a paper file of your own?
A. Yes. And there were two papers. It was the Vorpahl and Coe article that I had in my paper file. I had an old copy of the Baselt from a previous edition.
And I had the Holmgren article that, you know, talked about -- I had it in the digoxin file, but it doesn't even talk about digoxin. It was just there for general postmortem information.

Q. What do you charge for your time, Doctor?

A. I don't charge. The company sets a fee of 350 an hour for me.

Q. What does the for-profit company that you work for charge for your time?

A. $350 an hour.

Q. Okay. Is this -- the testifying, the expert testimony or the expert services part of this, is this something that you do by -- simply because of your employment here at NMS?

A. Yes. That's part of my job, to support that part of the company.

Q. How many other persons within NMS have as part of their job to offer expert testimony and give depositions like this?

A. Well, there's all the toxicologists. There are seven of us in the toxicology group who have testified and will support this. Some do it more than others.

We have our client -- our expert services folks, our records custodians that do testify on records, for example, certifying records and things.

Occasionally lab people are asked to

testify about what they did in a particular case. For example, if you wanted somebody who did this work to testify, they would do that.

So the main bulk is the toxicology group, but other people in the company have been involved in the expert services as well.

And then, of course, the people in the criminalistics lab, you know, do their things in terms of either DNA or product integrity work or pills, patterns and potions from police searches and things.

Q. How much did the vitreous and blood sample testing that was done back in 2008, how much did that cost?

A. I don't have the figures. I don't do any billing, and we don't put that in here.

If you wanted that information, we could provide that to you. But I have no knowledge of what it costs.

Q. In terms of the analysis that was done, you don't even know a ballpark of what that would cost?

A. Again, if you were to say how much does cocaine in blood cost, I can tell you that because I see it every day.

This is not a common analysis, so it's

not something that I would focus on. Again, we have 2500 tests.

Q. Okay. It might be different because it's digoxin that's involved.

Is that what you are telling me?

A. Yes.

Q. Okay. Do you have -- this is kind of my final kitchen-sink wrap-up question.

You have heard many of those if you have testified, haven't you?

A. This is the one before the next one and the next one and the next one.

Q. Well, it depends on what your answer is.

All I want to know is if you have any other ballpark opinions, or opinions you consider to have enough reliability that you would offer to the jury in this case, other than your back calculation opinion that we have already discussed?

A. No. I think -- I mean, through the questioning and the answering I have had today, I think I have expressed everything that I would say to a jury if asked to attend.

Unless there was a different question that came up, and if I could provide the answer, I

would, and if I couldn't, I would say so.

So as I sit here today, I think I've covered everything that I would testify to.

Q. Well, if you come up with another opinion or medical literature or some other support outside your litigation packet that in any way supports your opinion, would you please advise Mr. Miller or one of us so that we could ask you questions about that before trial?

A. I will certainly do that.

MR. McPHAIL: Thank you, Doctor.

THE WITNESS: You're welcome.

MS. AHERN: I do have some questions, but if you wouldn't mind, I'd like to take a break real quick.

(A recess is held.)

EXAMINATION

BY MS. AHERN:

Q. Hi.

A. Hello.

Q. Dr. Barbieri, we met before. I'm Hunter Ahern, and I have a few more questions for you.

A. Sure.

Q. I just want to sort of clarify a little bit what your role is, what your role has been in the

testing of these samples that were given to you.

My understanding is that NMS Laboratory provides a number of services to people, a number of forensic services, including toxicology services, correct?

A. Yes.

Q. And you have a number of packages that you also provide, you have a basic, an expanded and an expert panel of toxicology testing that you can provide to people. Is that correct?

A. Yes. Those are autopsy panels of various complexities.

Q. Okay. You were the expert -- I was just looking at your Website.

Under the expert panel, it says it's the largest current library of the most relevant drugs, metabolites, poisons and toxins for comprehensive death investigation, correct?

A. Yes.

Q. You were not asked to do a comprehensive death investigation, correct?

A. No. These were focused tests for one compound.

Q. How often are you asked to do tests for a single compound?

A. Quite often.
Q. And for what purpose usually?
A. We don't know that.
Q. In this case would it be litigation?
A. Well, when we received the sample, we didn't know that. We know that now. But at the time we received the samples, we didn't know that.
We have a client who contacted us and sent us a specimen, and we did what we were asked to do.
Q. Okay. So the only thing that you can opine on in this particular case are digoxin levels, correct?
A. Yes.
Q. You testified that you were not a medical doctor?
A. That's correct.
Q. You are not a clinical pathologist or a clinical toxicologist?
A. That's correct.
Q. You have never treated patients, correct?
A. As a pharmacist, but not as an M.D.
Q. Have you ever treated patients or diagnosed patients with digoxin toxicity?

A. No.
Q. So is it fair to say that your experience with digoxin as a medication is that of a laboratory researcher?
A. And as a pharmacologist and teaching.
Q. Teaching?
A. Yes.
Q. But not in patient care.
A. Not in patient care, no.
Q. And not in diagnosing clinical signs and symptoms of digoxin toxicity.
A. No.
Q. And this number that we calculated back, this 12 nanogram per mL that you are estimating based on the postmortem blood sample that was taken for Ms. Johnson, can you tell me -- I'm going to go through the assumptions that you are making for this particular level, correct?
Sorry, strike that.
Is it correct that you have made a number of assumptions in order to get to 12 nanograms per mL?
A. I did.
Q. The first assumption would be that her last dose was taken on April 26 of 2008, correct?

A. Yes.
Q. And that's a significant assumption, isn't it?
A. Well, that's what was represented to me. So I'm really not assuming that; I was told that.
Q. And I understand that.
But it would be -- your estimate would be significantly different or it could be significantly different if you were to find out that her last dose was actually taken on April 27th?
A. It would make a difference, yes.
Q. So the information that you were given by plaintiff's counsel, that her last dose was taken on April 26th, is a significant basis for your 12-nanogram-per-ML estimate, correct?
A. Yes.
Q. Another assumption that you are making is that she had normal renal function?
A. Yes.
Q. Pharmacokinetics of digoxin are greatly affected by the status of renal function in an individual, correct?
A. They are.
Q. And why is that?
A. Because digoxin is mainly secreted

unchanged primarily in the body through the kidney.
Q. So even low levels of renal insufficiency can greatly affect serum digoxin concentrations in an individual, correct?
A. Well, I don't know significantly and greatly. I know they will affect. How high, I can't answer that.
Q. And you testified that you were not given any medical records to review for Martha Bea Johnson?
A. That's correct.
Q. And you did not ask to review any medical records for Martha Bea Johnson?
A. That's correct.
Q. So you have no information about what other drugs Martha was taking?
A. That is correct.
Q. Or how many other drugs she was taking?
A. That's correct.
Q. And you are aware that digoxin is a drug that interacts with a number of other drugs, correct?
A. Yes.
Q. And that a number of other drugs can affect levels of digoxin in the serum?
A. There are certain drugs, yes.

Q. Would that be both ante and postmortem potentially?

A. Well, the drug interactions in terms of digoxin would be antemortem in terms of either metabolism or effective secretion. It would not change postmortem levels.

Q. Sorry, I meant -- it was a bad question.

What I meant was, the interactions antemortem would affect what you see postmortem potentially.

A. Yes, of course.

Q. We are also making the assumption that the postmortem to antemortem ratio was three and not something higher like ten, that she was not an outlier.

A. I made that assumption, yes.

Q. And if she, for instance, was an outlier, was on the extreme end of that, and the postmortem to antemortem ratio was something like ten, that would significantly affect the calculation that you made antemortem, correct?

A. Yes. And as I stated, I would recalculate based upon that information given to me.

Q. So, so far the assumptions we are making

are based on the information you have.

We are assuming that her last dose was take on the 26th of April, 2008.

A. Yes.

Q. We are assuming that there were no other significant drug interactions antemortem that might have affected her serum digoxin concentration?

A. Yes.

Q. We are assuming that she had normal renal function.

A. Yes.

Q. We are assuming that the postmortem to antemortem ratio was somewhere around three, not higher.

A. Yes.

Q. We are also assuming that her symptoms of diarrhea and stomach cramps were not -- were attributed to high levels of digoxin.

A. No, I didn't make that assumption.

Q. So I just want to make sure, though, that you had mentioned that what you could say is that you believe her antemortem levels on the 26th would have been high, right around the same time she was exhibiting symptoms of diarrhea and stomach cramps.

A. Yes. And the one assumption that you

didn't include was I assumed a half-life of about 24 hours, which would fit into the pattern here of the drug; which came about when we estimated the peak level based upon that dosing.

Q. Correct.

A. Not the symptomatolgy necessarily.

Q. And thank you.

And the half-life, of course, would be affected by her renal function and a number of other things as well.

A. It would.

Q. Okay. So in other words, if her renal function, if she was -- if she had some renal insufficiency due to dehydration or something else, that would have prolonged the period of time that it took to clear digoxin.

A. It would.

Q. Doctor, I just want to make sure that when you said that you could testify that her levels on the 26th were, in your opinion, high or elevated beyond the normal therapeutic range, you are not also going to testify that that somehow correlated with any clinical symptoms that you could attribute to toxicity.

A. No.

Q. Because you are not a medical doctor.
A. Right.
Q. And you would defer to a medical doctor, a cardiologist, and treating physicians to make that determination.
A. I would.
Q. Can I ask you, are you aware of a particular serum digoxin concentration that you would expect to see cardiac symptoms with?
A. Cardiac symptoms can occur even at low therapeutic levels, down, let's say, one nanogram per mL; there's certain patients who would exhibit toxicity at that low therapeutic level.
Q. And what sorts of cardiac symptoms would you expect to see in a patient exhibiting toxicity?
A. You would see an increase in heart rate. You would see occasionally a premature ventricular contraction or more than the normal premature ventricular contraction. Things that digoxin would cause.
Q. And would those sorts of things usually be picked up by a treating physician, especially in this situation where the patient is actually hospitalized for surgery?
A. On the electrocardiogram?

Q. Yes.
A. It would be.
Q. Okay. And would you expect to see cardiac symptoms in a patient exhibiting a 12-nanogram-per-mL blood level?
A. I'm sorry. Would I expect to see those symptoms?
Q. Yes, sir.
A. I would.
Q. Okay. Do you have any evidence to suggest that these symptoms -- that Martha Bea Johnson had any cardiac symptoms on the 26th of April, 2008?
A. I have no information of that.
MS. AHERN: I think, sir, that is all that I have at this time. I think that Mr. Moriarty may have a few follow-up questions. Thank you very much.
THE WITNESS: Thank you.
(Discussion off the record.)

EXAMINATION

BY MR. MORIARTY:
Q. I just need to spend a few minutes mopping up a few loose ends, okay?
A. Sure.
Q. If I understand what you are saying, you

can't testify to a reasonable degree of probability or certainty that the SDC that the time Mrs. Johnson actually died was three or four or 2.5 or 1.5, or any other specific number, correct?

A. You're correct.

Q. At the time she died her serum digoxin concentration would be speculative, correct?

A. Yes, it would be.

Q. And in this back calculation that you have done with your estimates, essentially you are not saying to a reasonable probability that the number on the afternoon of the 26th was 10, 11, 12, correct?

A. That's right, I said that.

Q. Okay. And you are speculating about what the number would be the afternoon of the 26th, correct?

A. Well --

Q. The day supposedly of her last dose.

A. I don't like the word "speculating." I'm trying to estimate from the factual data that I have.

So if you want to call it speculation, that's your word. I wouldn't use that word.

Q. So the estimate is a range, correct?

A. It could be a range, yes.

Q. And then that estimate is based on the assumptions that Ms. Ahern just went through, correct?
A. Yes, that's correct.
Q. And among the assumptions, when you say a PMR of only three, you are sort of assuming a PMR of three because it's based on one article that you looked at, which is based on another article that they looked at and then cited, correct?
A. Yes.
Q. And so there are number of assumptions in those articles that lead to the average of two or three that you then assumed, right?
A. Well, I don't think they are really assumptions. I mean, the article, that Vorpahl and Coe article has objective data, and the authors used that objective data to come to a conclusion.
And so by the mathematical calculation they came up with a number.
Q. Sure.
But just, for example, I think we pointed out earlier that there are no reports in the Vorpahl article of blood draws after 22.5 hours, correct?
A. That's correct.
Q. All right. So when they reached their

average and their mean, they didn't include blood draws out at 44 hours like we have here.

A. You're absolutely correct.

Q. So that is in some way an assumption upon which your assumptions are built.

A. I understand your point, yes.

Q. Okay, good.

And you only -- in your back calculation you only took into account the heart blood sample, correct?

A. That's right.

Q. All right. What are we doing with the vitreous sample?

A. What are we doing with it? It's -- the compound is present in the vitreous sample.

Q. So she was obviously taking the drug.

A. Okay.

Q. Because she was prescribed the drug.

A. And what would anybody want me to do with it. I was asked to try to do a calculation of the blood concentration based on that.

And I said the variability was too great, and I could not come up with any conclusion about that.

Now, again, we can speculate about that,

but I chose not to do that.

Q. But why didn't you use the vitreous level which was within the therapeutic range to do your calculations as opposed to the blood level that was nine times the therapeutic range?

A. First of all, the vitreous is not a therapeutic range. The number is within a serum therapeutic range certainly.

But knowing that the vitreous levels change over time, and, again, without having, you know, hard factual data about, you know, what happened with her treatment and et cetera, there were even more assumptions if I try to do that calculation.

So I thought that was even more speculative than anything I would do with the blood. At least I had the same matrix that I'm working with rather than trying to cross tissue lines.

Q. But at least there was some peer-reviewed literature saying that vitreous is more accurate than postmortem blood, correct?

A. There is. And I came up with, again, based upon what's cited again from Vorpahl in terms of average numbers of the vitreous levels that they had.

I could come up with a number, as I did with the blood sample, but I think that that is less

reliable than blood itself.

Q. I may have missed this one, Ms. Ahern was questioning you.

But was one of your assumptions that Mrs. Johnson's electrolytes were normal?

A. That would be a part of it.

Q. Did Mr. Miller or Mr. Deligans ask you to assume that her electrolytes were normal?

A. They asked me to do no assumptions at all.

Q. Did they tell you what her illness was on the day of the 26th?

A. No.

Q. So whatever that illness was, you don't have any idea of how often she may have had that illness or condition prior to the 26th.

A. That's correct.

Q. Do you know anything from the reported medical literature about what the majority of people's response would be to a serum digoxin concentration of 12?

A. Literature value or literature information?

Q. Yes, sir.

A. Most people would die from a serum

concentration of 12.

Q. Okay. Close in time to when it was 12, right?

A. Yes.

Q. Not close in time to when it had dropped to six, five, four, three, two, one, right?

A. Yes.

Q. Do you know any literature that supports the conclusion that you just mentioned?

A. Well, I'm sure -- I don't know of any specific things I can cite. Again, it's general knowledge that I've obtained over the years from reading about the compound and as I taught about the compound.

Q. So the vast majority of people who had a serum digoxin concentration of 12 would have a lot more signs and symptoms than diarrhea or nausea, correct?

A. I would say that would be absolutely correct.

Q. And if a patient is significantly bradycardic or significantly tachycardic, they can generally sense that in one way or another or exhibit signs or symptoms consistent with that, correct?

A. People have described feeling that their

heart has changed in some way.
Q. In tachycardia they might say my heart is racing or it's palpitating or something, right?
A. Yes.
Q. Are you familiar with a compound called Senokot?
A. Yes. Senokot is a laxative.
Q. It could cause diarrhea or GI upset?
A. It could.
Q. Did you ever discuss this case and your opinions with anyone else at NMS?
A. No.
Q. And your calculation under these circumstances and assumptions is a theory, correct?
A. Well, it's theoretical.
Q. Other than the assumed PMR level of two or three, is there anything in the published peer-reviewed medical literature that supports your back calculation?
A. The only other part of the back calculation that really is included is the elimination half-life, the average elimination half-life that I've used for the case, as the time line was presented.
Q. Okay. Well, if you assumed a different number, such as nine or ten, what would the serum

digoxin concentration have been under your back calculation?

A. I'm sorry. Nine or ten what?

Q. A PMR level of nine or ten instead of two or three.

A. Okay, let me walk this through with you.

Let's say we had -- we have a postmortem measured value of 18 in her blood. We take a PMR value of ten, so that reduces it to 1.8 at approximately the time of death.

And, again, taking one half-life, the estimated calculation would be double that or 3.6 nanograms per mL.

Q. Are you talking about a time of death or at this --

A. At approximately 3:00 p.m.

Q. On the 26th?

A. On the 26th.

Q. I just have to ask you about a couple of articles, and then I'll be done.

Okay, this is an article by Cook and Braithwaite in the Journal of Clinical Pathology in the year 2000.

First of all, do you ever read or review

articles from the Journal of Clinical Pathology?

A. No, very rarely.

Q. All right. Have you ever read this article?

A. I have not seen this, no.

Q. At page 282, in the right-hand column, first full paragraph, it says: Often pathologists or toxicologists are requested to estimate the amount of drug present at the time of death or the number of tablets consumed.

Did I read that correctly?

A. Yes.

Q. This assumes that the drug concentration found at postmortem examination is a reliable estimate of that present at the time of death.

Did I read that correctly?

A. You did.

Q. Then it say: There is a lack of evidence that such an extrapolation is possible.

Do you agree with that statement?

A. In general, yes.

Q. All right. And let's go to 284, two pages later.

Under Discussion: These six cases illustrate that it can be dangerous to attempt to

relate a drug concentration found at postmortem examination to the antemortem circulating concentration or to the antemortem dose received.

Do you agree with that?

A. I can't agree or disagree, because I haven't read all the article and the information that they provided. So they are making a conclusion based on something I haven't looked at.

Q. Okay. Next column -- I'm sorry, same column, last full paragraph. It says in the second -- third sentence: The use of premortem/antemortem ratios or back extrapolation from a postmortem concentration is not recommended.

Do you agree with that?

A. Again, in general. We have talked about this before. I said I agree with that, but there are certain situations, as I explained, that I would not agree with that.

Q. All right.

A. Okay.

Q. Next column, last paragraph: Our study shows that a high degree of error can arise from attempting to predict antemortem concentrations from postmortem concentrations, and emphasizes the need for continued research into the area of pathology

practice.

Did I read that correctly?

A. You did.

Q. The next sentence says: In the absence of such data, estimates of circulating drug concentrations during life should not be made.

Do you agree with that?

A. No, I don't.

Q. This is an article in 2003 from the Journal of Analytical Toxicology.

Do you see that?

A. Yes.

Q. In 2003 were you a reviewer for the Journal of Analytical Toxicology?

A. Yes, I was.

Q. Do you know if you were a reviewer for this specific article?

A. I was not.

Q. Have you read this article?

A. I have.

Q. Do you know anything about these authors?

A. No, not specifically.

Q. You have published articles in the Journal of Analytical Toxicology, haven't you?

A. I have.
Q. So I assume you consider it to be a reliable source?
A. It's a very good journal.
Q. At page 533, under Introduction, they are talking about evaluating blood concentrations in the living based on various pharmacokinetic characteristics, aren't they?
A. Yes.
Q. Then it says: This evaluation is generally not possible in the postmortem period.
The main reason for this is that the concentrations obtained from postmortem samples do not necessarily reflect the blood concentrations at the time of death due to variations in the concentrations according to sampling site and the interval between death and sampling.
Do you agree with that?
A. Yes, I do.
Q. And then let's go to page 535, second column. It says: Redistribution from the myocardium. In the living many cardiac drugs are concentrated in the myocardium.
One of the best examples is digoxin with an in vivo myocardic concentrations 30 times higher

than that in heart blood.

Do you see that?

A. Yes.

Q. Do you agree with that?

A. Yes. There's data to support that. That means the myocardial tissue has concentrations 30 times higher than blood in the heart.

Q. Right. And then skipping one sentence, it says: Rapidly these drugs are redistributed into cardiac blood in which concentrations rise dramatically.

Do you agree with that?

A. Again, in general. It's a little bit flowery in terms of what it's saying, but -- you know, dramatically and -- yes, but certainly concentrations rise. We know that.

MR. MORIARTY: That's all I have for you, sir. Thank you.

THE WITNESS: You're welcome.

EXAMINATION

BY MR. McPHAIL:

Q. Doctor.

A. Yes, sir.

Q. In your litigation packet.

A. Yes. Is there a page number that I can

refer to?

Q. Just let me hand it to you.

MR. McPHAIL: Brad, will you pass that to him?

BY MR. McPHAIL:

Q. That looks to me to be like a bill for at least part of the NMS services provided, but I didn't see anything else in the lit packet that was produced. Well, that's the copy that we got, and maybe it is in your complete set.

But should all of the billing information, all of that be in the litigation packet that relates to one or two -- one or the other two of these work orders that you processed?

A. Let me explain that and then answer your question, if I may.

This is the bill for the production of the lit pack materials itself from expert services. My review, as you see, spending time at no charge. And so this is the copying, the shipping of the expert services work.

Should the bill for the testing? We don't normally do that, to put it in the lit pack, because that's maybe confidentiality in terms of different clients or whatever.

But, again, if you were to request that, we have no problem producing that for you.

Q. Okay.

A. And if you do wish that, just let us know, and we will search out the records and produce that for you.

Q. Is there anything else that NMS creates in the way of documentation that is not in the lit pack?

A. Well, as we started earlier when we were going through the request for documents, there were things like the preparation of -- let me finish -- preparation of the standards, certification analysis.

Instrument maintenance records, which we have and are produced for any inspector who comes in to look.

These are all things that -- QC charts, which were brought up.

These are all things that we don't normally put in, but we can. If anybody wants them, we can provide all that information.

Q. Let me narrow my question.

A. Please.

Q. Is there anything in this lit pack related to the Martha Johnson samples, the work done

on the Martha Johnson case, any documents related to Martha Johnson that's not in the Martha Johnson lit pack?

A. No.

Q. That's what I was getting at.

A. No, there's not.

Q. Okay.

A. And I supplement it, as I gave today, the things that I found when I did the review, because we realized we had missed that.

Q. That's fine.

A. So, yes, there's nothing that I know of specific to this case that we did not provide to you.

Q. Okay. You also mentioned to Ms. Ahern that you were a pharmacist?

A. I have a pharmacy degree.

Q. You are not going to be offering any pharmacy opinions in this case, are you?

A. None whatsoever. I haven't practiced pharmacy in years, and I would not go there, no.

Q. In fact, you are not going to be offering any opinions at trial that any of the defendants did anything wrong here, are you?

A. No, sir, not at all.

MR. McPHAIL: Thank you.

MR. MORIARTY: I'm done.

You have been through this enough to know your rights to read and sign the transcript or to waive that right.

I actually prefer with all this technical terminology and how fast I read those article excerpts that you read and sign, okay?

THE WITNESS: Boy, that will be dull reading.

MR. MILLER: Doctor, you can do what you want.

THE WITNESS: To be honest, it's going to be a lot of time.

MR. MORIARTY: If you don't want to read and sign. It's your right, not mine.

THE WITNESS: No. If we find an issue, I will correct it later, but I'm going to waive it.

MR. MORIARTY: Stay on the record, because the only thing we still need to get copied and made into an exhibit is the lit pack for the blood specimen.

THE WITNESS: Okay. This lit pack was sent to -- was sent to the requesting agency, that would be the Analytical Research Lab. So we can produce another copy for you, not a problem.

MR. MORIARTY: That's fine.
THE WITNESS: Okay.
MR. MORIARTY: I have Exhibit 2, which is apparently not a complete lit pack of both specimens. So I just need the lit pack for --
THE WITNESS: So that's for the blood work, okay, so you need a copy of that.
MR. MORIARTY: And I would just suggest that that be made Exhibit 13 once it gets produced. Is that okay with you?
MR. MILLER: I don't care, that's fine.
THE WITNESS: As long as everybody's okay, we are going -- because this is going to be copied, it's going to be paginated with the handwritten material on it.
MR. MORIARTY: Sure.
THE WITNESS: Written numbers.
And there are 50-some pages, and I think there's a certification with that.
MR. MORIARTY: Fifty-seven pages.
THE WITNESS: Right. And I do have a certification, so I'll make a copy of that as well.
MR. MORIARTY: Okay.
(Exhibit No. Barbieri 13, Litigation Support Package, WO# 08232082, marked for

identification.)

(Deposition concluded at 1:16 p.m.)

CERTIFICATION

I, JANICE D. BURNESS, Registered Professional Reporter, Certified Shorthand Reporter, certify that the foregoing is a true and accurate transcript of the foregoing deposition, that the witness was first sworn by me at the time, place and on the date herein before set forth.

I further certify that I am neither attorney nor counsel for, not related to nor employed by any of the parties to the action in which this deposition was taken; further, that I am not a relative or employee of any attorney or counsel employed in this case, nor am I financially interested in this action.

_____
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